

REMARKS

I. Status Summary

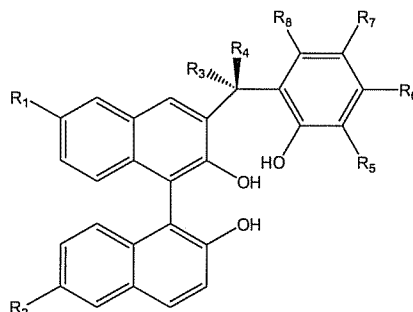
Claims 1, 2, and 14-31 are pending in the present application. Claims 18, 19, 25, 27, 28, and 31 have been withdrawn by the U.S. Patent and Trademark Office (hereinafter the "Patent Office"). Claims 1, 2, 14-17, 20-24, 26, 29, and 30 have been rejected by the Patent Office.

Claims 1 and 14-17 have been amended. Withdrawn claims 18, 19, and 25-27 have been amended. Support for the amendments can be found in the specification as filed. No new matter has been added. Therefore, upon entry of Amendment A, claims 1, 2, 14-17, 20-24, 26, 29, and 30 will be pending in the subject application.

Reconsideration of the application as amended and further in view of the remarks set forth herein below is respectfully requested.

II. Response to Rejections Under 35 U.S.C. § 103(a) over Yoichi, Ishitani or Maruoka in view of Howarth

Claims 1-2, 14-17, 20-24, 26, and 29-30 have been rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Yoichi et al. (JP2002275112; hereinafter "Yoichi"); Ishitani et al. (*Tetrahedron Letters* (1999), 40, 2161-2164; hereinafter "Ishitani") or Maruoka et al. (*J. Org. Chem.* (1993), 58, 2938-2939; hereinafter "Maruoka") in view of Howarth et al. (*Molecules* (2000), 5, 993-997; hereinafter "Howarth"). In particular, the Patent Office alleges that Yoichi teaches a catalyst compound useful as an asymmetric synthesis catalyst having the formula:



The Patent Office alleges that Ishitani teaches a zirconium-bis(binaphthol)methane complex useful as an asymmetric catalyst. The Patent Office further alleges that Maruoka teaches chiral helical Lewis acids derived from titanium tetraisopropoxide and

a chiral ligand derived from binaphthol for use as catalysts in asymmetric Diels-Alder reactions. The Patent Office contends that, although the presently claimed subject matter differs from Yoichi, Ishitani, and Maruoka by reciting the use of a niobium compound in the synthesis of the catalyst, the use of niobium with a chiral multi-hydroxy ligand would have been obvious to one of skill in the art in view of Howarth. The Patent Office contends that Howarth teaches Lewis acid catalysts for Diels-Alder reactions that use niobium chlorides in the presence of coordinating ligands.

After careful consideration of the rejection and the Patent Office's comments, applicants respectfully traverse the rejection and offer the following remarks.

Initially, applicants respectfully submit that claim 1 has been amended herein to recite that the asymmetric reaction catalyst can catalyze an asymmetric reaction selected from the group consisting of an asymmetric Mannich reaction, an epoxide asymmetric ring opening reaction, an asymmetric allylation reaction, an asymmetric cyanation reaction and an asymmetric alkylation reaction. Support for the amendment can be found in the instant specification at page 10, lines 17-21.

Claims 14-17 have been amended herein in a non-limiting manner to remove parentheses and a comma. Support for the amendments can be found in claims 14-17 as previously presented.

Applicants respectfully submit that claims 1, 2, 14-17, 20-24, 26, 29, and 30 relate to catalysts and methods related to catalysts comprising niobium triol or tetraol complexes that can catalyze reactions selected from the group consisting of an asymmetric Mannich reaction, an epoxide asymmetric ring opening reaction, an asymmetric allylation reaction, an asymmetric cyanation reaction and an asymmetric alkylation reaction. Applicants respectfully submit that Howarth at best describes the chiral induction of Diels-Alder reactions using niobium catalysts comprising bis-oxazoline, pybox, and Jacobsen-type ligands. See Howarth, page 993. Compared with the triol and tetraol ligands of claim 1, the ligands of Howarth each include at least two nitrogen coordinating atoms. Applicants further respectfully submit that Howarth describes that when the complex formed from NbCl₅ and the *R,R* Jacobsen ligand is used in Diels-Alder reactions, catalysis is not actually observed. See Howarth, page 996, first full paragraph and Figure 3. Thus, applicants respectfully submit that there

would be no reasonable expectation of successfully combining metal atom and coordination ligand in metal complex catalysts based on Howarth, as proposed by the Patent Office in the cited combination.

Accordingly, applicants respectfully submit that the teachings of Howarth would not suggest the use of niobium complexes to catalyze the reaction types recited in claim 1, particularly using the oxygen atom-only coordinating ligands described in Yoichi, Ishitani, or Marouka. Applicants additionally note that Marouka relates to titanium catalysts for Diels-Alder reactions, and not to catalysts for the reactions recited in claim 1. Thus, in particular, Marouka and Howarth would not teach or suggest catalysts for the reactions recited in claim 1, as proposed by the Patent Office in the cited combination.

Accordingly, applicants respectfully request that the rejection of claim 1 and its dependent claims, claims 2, 14-17, 20-24, 26, 29, and 30 under 35 U.S.C. § 103(a) in view of Yoichi, Ishitani, or Marouka in view of Howarth be withdrawn and further ask that claims 1, 2, 14-17, 20-24, 26, 29, and 30 be allowed at this time.

III. Other Amendments

Withdrawn claims 18, 19, and 25-27 have been amended for non-limiting purposes to remove parentheses and comma markings. Support for the amendments can be found in claims 18, 19, and 25-27 as previously presented. No new matter has been added.

CONCLUSIONS

Should there be any minor issues outstanding in this matter the Examiner is respectfully requested to telephone the undersigned attorney. Early passage of the subject application to issue is earnestly solicited.

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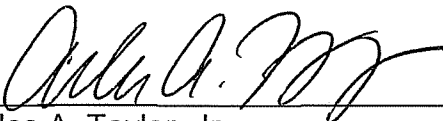
DEPOSIT ACCOUNT

The Commissioner is hereby authorized to charge any other fees associated with the filing of this correspondence to Deposit Account Number 50-0426.

Respectfully submitted,

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